Plant Document Analysis

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End of Engineering Analysis Report

ENGINEERING SPECIFICATION ANALYSIS

Focus Area: Nozzle Load Analysis

Generated on November 21, 2025

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Section 1: Accepted Specifications for Evaluation of Nozzle Load Analysis

• Appendix P (Addition) – Table of mandatory minimum external nozzle loadings at the nozzle-to-shell junction (radial loads, circumferential moment, longitudinal moment) for standard nozzle sizes (values given in document; see Measurements Provided below).

• Statement that nozzle loads higher than table values may be specified by CONSTRUCTION MANAGER and CONTRACTOR shall confirm acceptability or advise maximum acceptable loading for the tank design (CONTRACTOR responsibility).

• Loadings shown apply at the nozzle-to-shell junction.

• Nozzle sizes 2" and below: loads are considered negligible (per table note).

• Nozzle flanges above 24" NB (except manways) shall be per ANSI B16.47 Series B type (5.7.6.1.a Addition).

• Loadings for nozzles greater than 24" NB to be agreed between CONTRACTOR and CONSTRUCTION MANAGER (Appendix P).

• Vendor Data Requirement (12.2): "Nozzle load Analysis" is explicitly required to be submitted during Manufacturing & site erection.

• CONTRACTOR shall provide calculations justifying acceptability of the specified external nozzle and support pad loading (Appendix P).

• The document requires that anchor chairs (and anchor bolt locations) be positioned to clear nozzles and manways (5.12.6 Addition) — relevant to nozzle load & reinforcement layout.

Section 2: Measurements Provided in Document

• Nozzle load table (loads applied at nozzle-to-shell junction):

• " and below: Loads are considered negligible.

• ": Radial load = 1,000 N; Circumferential moment = 200 Nm; Longitudinal moment = 200 Nm.

• ": Radial = 1,500 N; Circumferential moment = 300 Nm; Longitudinal moment = 300 Nm.

• ": Radial = 2,500 N; Circumferential moment = 700 Nm; Longitudinal moment = 700 Nm.

• ": Radial = 4,000 N; Circumferential moment = 1,500 Nm; Longitudinal moment = 1,500 Nm.

• ": Radial = 5,000 N; Circumferential moment = 2,500 Nm; Longitudinal moment = 2,500 Nm.

• ": Radial = 7,000 N; Circumferential moment = 4,000 Nm; Longitudinal moment = 4,000 Nm.

• ": Radial = 9,000 N; Circumferential moment = 6,000 Nm; Longitudinal moment = 6,000 Nm.

• ": Radial = 11,000 N; Circumferential moment = 8,000 Nm; Longitudinal moment = 8,000 Nm.

• ": Radial = 13,000 N; Circumferential moment = 10,000 Nm; Longitudinal moment = 10,000 Nm.

• ": Radial = 15,000 N; Circumferential moment = 13,000 Nm; Longitudinal moment = 13,000 Nm.

• ": Radial = 20,000 N; Circumferential moment = 18,000 Nm; Longitudinal moment = 18,000 Nm.

Section 3: Inputs and Additional Requirements from Client (explicit in document)

• Vendor data submission requirement: Contractor must submit "Nozzle load Analysis" as part of manufacturing & site erection deliverables (12.2.viii).

• CONTRACTOR is responsible to confirm acceptability of specified external nozzle and support pad loading or advise the maximum loading acceptable for the tank design (Appendix P).

• If nozzle loads greater than the table are specified by CONSTRUCTION MANAGER, CONTRACTOR must handle confirmation (Appendix P).

• For nozzles >24" NB, loadings must be agreed between CONTRACTOR and CONSTRUCTION MANAGER (Appendix P).

• Anchor chairs (and anchor bolt layout) must clear nozzles and manways — CONTRACTOR to locate accordingly (5.12.6 Addition).

• Minimum distance from bottom of tank to centre line of any nozzle or manway shall be as per API Standard 650 Table 5.6a (document references this requirement but does not provide numeric values).

• Calculations justifying acceptability of specified external nozzle and support pad loading (Appendix P) — i.e., the document requires the analysis but does not provide tank■specific loads, locations, or piping geometry.

• Agreement/confirmation of any nozzle loadings above the table values and for nozzle sizes >24" NB (to be resolved between CONTRACTOR and CONSTRUCTION MANAGER).

• The tank data sheet is to provide specific tank configuration, service data and applicable loads (document states OWNER will provide these on the tank data sheet). The specification itself does not include those tank■specific inputs.

Notes on scope and limitations (strictly from the document)

• The document provides mandatory minimum nozzle load values (see table) and procedural obligations (submission of nozzle load analysis, CONTRACTOR confirmation) but does not contain any tank■specific nozzle positions, piping geometry, actual specified external loads beyond the table, reinforcement/pad dimensions, or orientation data — these are required from the tank data sheet/CONSTRUCTION MANAGER or to be determined and submitted by the CONTRACTOR.

• Produce a checklist of the exact tank■specific inputs the CONTRACTOR must submit to perform a complete nozzle load analysis (based strictly on what the document requires), or

• Prepare a template Nozzle Load Analysis deliverable aligned to the document’s requirements (showing where to insert tank■specific numbers).

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